

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims:

Claims 1 - 39. (Canceled)

Claim 40. (Currently amended) A fluorescent silica-based nanoparticle comprising:

a silica-based core comprising and organic functional group
comprising a mercapto substituent group;

[[a]] an organic fluorescent compound positioned within the silica-based core; and

a silica shell surrounding at least a portion of the core,

wherein the fluorescent silica-based nanoparticle comprises has a diameter ~~between about 10 nm and about 70 nm~~ of 70 nm or less and is conjugated to a ligand.

Claims 41-44. (Canceled)

Claim 45. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the diameter is 50 nm or less.

Claim 46. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the ligand comprises at least one of a protein, a peptide, or an oligopeptide.

Claim 47. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the ligand is conjugated to the nanoparticle by a coupling agent comprising at least one carbon containing linkage, the carbon containing linkage selected from the group comprising an ester linkage, a thiolester linkage, an amide linkage, a sulfate ester linkage and combinations thereof.

Claim 48. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the silica shell covers from about 10 percent to about 100 percent of the surface area of the core.

Claim 49. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the silica-based core further comprises a silica-based network, wherein the fluorescent compound is covalently attached to the silica-based network.

Claim 50. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the fluorescent quantum yield of the fluorescent organic dye in the nanoparticle is about two-fold to about three-fold greater than the fluorescent quantum yield of the same fluorescent organic dye free in aqueous solution.

Claim 51. (New) The fluorescent silica-based nanoparticle of claim 40, the mercapto substituent is bonded to a maleimide.

Claim 52. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the silica-based core has a radius between about 1.6 nm and about 3.5 nm.

Claim 53. (New) The fluorescent silica-based nanoparticle of claim 40, wherein the silica-based core has a radius between about 2.2 nm and about 2.9 nm.